

# COMBUSTION AND FLAME

## THE JOURNAL OF THE COMBUSTION INSTITUTE

VOLUME 80 1990

### Contents

S. KRISHNAN and R. JEENU (Madras, India)	
Subatmospheric Burning Characteristics of AP/CTPB Composite Propellants with Burning Rate Modifiers .....	1
F. N. EGOLFOPOULOS and C. K. LAW (Princeton, NJ)	
Chain Mechanisms in the Overall Reaction Orders in Laminar Flame Propagation .....	7
H. K. CHELLIAH (Princeton, NJ) and F. A. WILLIAMS (La Jolla, CA)	
Aspects of the Structure and Extinction of Diffusion Flames in Methane-Oxygen-Nitrogen Systems ..	17
PAOLO CANU, RENATO ROTA, SERGIO CARRA (Milano, Italy) and MASSIMO MORBIDELLI (Cagliari, Italy)	
Vented Gas Deflagrations: A Detailed Mathematical Model Tuned on a Large Set of Experimental Data .....	49
T. C. CHEW, K. N. C. BRAY, and R. E. BRITTER (Cambridge, England)	
Spatially Resolved Flamelet Statistics for Reaction Rate Modeling .....	65
M. RASHID KHAN, C. ELAINE EVERITT, and ALAIN P. LUI (Morgantown, WV)	
Modeling of Oxygen Chemisorption Kinetics on Coal Char .....	83
L. S. TZENG, ARVIND ATREYA, and INDREK S. WICHMAN (East Lansing, MI)	
A One-Dimensional Model of Piloted Ignition .....	94
Brief Comments	
PAUL A. LIBBY (La Jolla, CA) and K. N. C. BRAY (Cambridge, England)	
Comment on "Pressure-Containing Correlations in Variable Density and Turbulent Reacting Flows," by P. M. Gaskell and A. K. Lau .....	108
P. H. GASKELL and A. K. C. LAU (Leeds, England)	
Reply to "Comment on Pressure-Containing Correlations in Variable Density and Turbulent Reacting Flow," by Paul A. Libby and K. N. C. Bray .....	110

A. F. BICEN, D. G. N. TSE, and J. H. WHITELAW (London, England)	
Combustion Characteristics of a Model Can-Type Combustor .....	111
SEUNG WOOK BAEK and SUNGPYO SEUNG (Seoul, Korea)	
Parametric Analysis on the Post-Shock Wave Relaxation Zone of Carbon	
Particle-Laden Oxygen Gas .....	126
R. W. BILGER and S. H. STARNER (Sydney, Australia), and R. J. KEE (Livermore, CA)	
On Reduced Mechanisms for Methane-Air Combustion in Nonpremixed Flames .....	135
T. B. BRILL and R. SUBRAMANIAN (Newark, DE)	
Thermal Decomposition of Energetic Materials 35: A Mechanism Study of Decomposition	
and the Ignition-like Transition in Trinitromethyl Alkyl Compounds .....	150
R. K. KUMAR (Manitoba, Canada)	
Detonation Cell Widths in Hydrogen-Oxygen-Diluent Mixtures .....	157
N. C. BECK and A. N. HAYHURST (Cambridge, England)	
The Early Stages of the Combustion of Pulverized Coal at High Temperatures II:	
Measurements of the Size and Composition of the Resulting Char .....	170
DOUGLAS FEIKEMA, RUEY-HUNG CHEN, and JAMES F. DRISCOLL (Ann Arbor, MI)	
Enhancement of Flame Blowout Limits by the Use of Swirl .....	183
V. D. MILOSAVLJEVIC, A. M. K. P. TAYLOR, and J. H. WHITELAW (London, England)	
The Influence of Burner Geometry and Flow Rates on the Stability and Symmetry of	
Swirl-Stabilized Nonpremixed Flames .....	196
Brief Communication	
DANA T. GROW (Grand Forks, ND)	
Mass and Heat Transfer to an Ellipsoidal Particle .....	209
Erratum .....	214
Meeting Announcements .....	215
Books in Prints, Software Available and New Journals .....	217

J. O. KELLER (Livermore, CA) and I. HONGO (Yokohama, Japan)	
Pulse Combustion: The Mechanisms of $\text{No}_x$ Production .....	219
RICHARD J. MARTIN and NANCY J. BROWN (Berkeley, CA)	
Nitrous Oxide Formation and Destruction in Lean, Premixed Combustion .....	238
P. G. LIGNOLA and F. P. DI MAIO (Italy)	
Some Remarks on Modeling CSTR Combustion Processes .....	256
J. M. POWERS (Notre Dame, IL), D. S. STEWART, and H. KRIER (Urbana, IL)	
Theory of Two-Phase Detonation—Part I: Modeling .....	264
J. M. POWERS (Notre Dame, IL), D. S. STEWART, and H. KRIER (Urbana, IL)	
Theory of Two-Phase Detonation—Part II: Structure .....	280
R. BORGHI (Mont-Saint Aignan, France)	
Turbulent Premixed Combustion: Further Discussions on the Scales of Fluctuations .....	304
WILLIAM RYAN, KALYAN ANNAMALAI, and JERALD CATON (College Station, TX)	
Relation Between Group Combustion and Drop Array Studies .....	313
PER-ERIK BENGTTSSON and MARCUS ALDÉN (Lund, Sweden)	
Optical Investigation of Laser-Produced $\text{O}_2$ in Premixed Sooty Ethylene Flames .....	322
S. C. LI, F. A. WILLIAMS (La Jolla, CA) and S. B. MARGOLIS (Livermore, CA)	
Effects of Two-Phase Flow in a Model for Nitramine Deflagration .....	329
TODD D. FANSLER and EDWARD G. GROFF (Warren, MI)	
Turbulence Characteristics of a Fan-Stirred Combustion Vessel .....	350
JAMES S. T' IEN (Cleveland, OH)	
The Possibility of a Reversal of Material Flammability Ranking from Normal Gravity to Microgravity .....	355
JOHN E. DEC (Ann Arbor, MI) and JAY O. KELLER (Livermore, CA)	
Time-Resolved Gas Temperatures in the Oscillating Turbulent Flow of a Pulse Combustor Tail Pipe .....	358
S. V. SANKAR, J. I. JAGODA, and B. T. ZINN (Atlanta, GA)	
Oscillatory Velocity Response of Premixed Flat Flames Stabilized in Axial Acoustic Fields .....	371
D. KAUFMANN and P. ROTH (Duisburg, West Germany)	
Numerical Simulation of One-Dimensional Laminar Flames Propagating into Reacting Premixed Gases .....	385
F.-Y. HSHIEH and G. N. RICHARDS (Missoula, Montana)	
The Effect of Preheating of Wood on Ignition Temperature of Wood Char .....	395
C. TREVINO, C. HERRERA (UNAM, Mexico) and P. GARCIA-YBARRA (Madrid, Spain)	
Stability Analysis of a Simplified Model of a Fluidized Bed Combustor .....	399
K. C. ADIGA and D. O. SHAH (Gainesville, FL)	
On the Vaporization Behavior of Water-in-oil Microemulsions .....	412
Erratum .....	415